

Excursion to The City Hydro-Electric Plant Point du Bois

Saturday, August 28th, 1909

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Mr. Cecil B. Smith, the Construction
Engineer, has kindly consented to
conduct the party over the works

Application for Excursion Tickets must be
made at the Excursion Counter in the
Reception Room, not later than
2 p.m., on Thursday,
August 26th.

For Time Table see Back of Cover.

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The EDITH *and* LORNE PIERCE
COLLECTION *of* CANADIANA



Queen's University at Kingston

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**The Municipal Hydro-Electric Works of
the City of Winnipeg, now under con-
struction at Point Du Bois Falls on
the Winnipeg River, with trans-
mission and delivery of Elec-
tric Energy in the City.**

The present Public Utilities Company, which is operating in and around the City of Winnipeg, has a monopoly of such a nature that the Municipal Authorities have decided not to await the expiration of the present franchises, which would enable the City to assume control either of these present properties, or to arrange new agreements for further control of rates. The only other course logically open was to create competition, for the reason that the cost of fuel in Winnipeg is excessive and does not offer effective means of competition in itself by the private production of Electric Energy. This competition might have been created by chartering a second company for the production and sale of Hydro Electric Energy, but the history of such efforts has usually been that of amalgamation, and a repetition of monopoly. Whether or not such or any monopoly, is or is not, when regulated, for the best interests of a city, need not be discussed here, but the decision was reached in 1905 to construct Municipal Works, for the purpose of creating the competitive condition desired.

In that year a careful examination was made of the hydraulic resources of the Winnipeg River, which has its chief gathering grounds

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in the lake country of Western Ontario, and which flows through the eastern portions of the Province of Manitoba and empties into Lake Winnipeg, after passing through a rock-ribbed country very suitable for such works as were contemplated. The report presented justified the City Authorities in making contour surveys of the most promising power sites, which were performed during the following winter, after which followed engineers' estimates of cost in April, 1906, and a popular vote of \$3,250,000 in June, 1906, which indicated clearly the then desire of the property owners of the City, which was to expend the above mentioned sum on Municipal Hydro Electric Works.

In October, 1906, the designs for works were begun, and it was then contemplated to complete the same in two and a half years, but some delay has been occasioned by various events, chief of which might be instanced the financial stringency of 1907, which caused a set back of over a year; but the construction is now being vigorously prosecuted, over \$500,000 has been expended, and further contracts of over \$1,000,000 are now in process of completion, whilst further contracts for equipment and distribution are soon to be placed, and it is contemplated to have the works in operation ready for delivering power within the next eighteen months.

The undertaking will consist, when completed, of the following:

(1) A 60,000 h.p. Generating Station, operating under 45 feet to 46 feet of hydraulic head.

(2) A Seventy-seven Mile Transmission, consisting of four three-phase circuits carried on two series of double circuit steel towers with concrete footings.

(3) A Terminal Station in the City, at which the pressure of the current transmitted will be reduced to 11,000 volts.

(4) An Underground Cable Distribution to sub-stations.

(5) Three or more Sub-Stations where the voltage will be reduced to 2,200 volts and or 550 volts.

(6) A Secondary Underground and Over-head Distribution to customers.

It is proposed to describe briefly the component parts (1), (2) and (3) above enumerated. The distribution has not yet been studied in detail.

(1) Generating Station at Point du Bois: Nature has here been beneficent, and the following imporant features are in evidence:—

(a) A large lake adjacent to the head gates, with consequent favorable operating conditions;

(b) A contour favorable to economical works;

- (c) Rock foundations for all constructions;
- (d) A difference of hydraulic level which will be practically constant;
- (e) A water free of silt, or any other objectionable matter, either dissolved or in suspension.

After studying various possible designs, it was decided to build concrete overflow walls, a rock-filled dam, and a power house with wheel pits built as an integral part of the head block, and a transformer station, also integral with the power house itself. Further consideration of cost and climate gave as a result an enclosed forebay room, and double runner turbine units of 5200 h.p. capacity each, at a speed of 164 r.p.m., also motor operated head gates protected by stop log arrangements; the whole power house being again protected by head gate piers in the canal, by which the canal can be unwatered by the use of stop logs.

The Generating Room will ultimately contain two turbine driven exciters, 250 k.w. each, and two motor driven exciters of the same capacity, and sixteen main generator units of 3,000 k.v.a. each, operating at 6,600 volts, 60 cycles, three phase; of the above five main units and two exciters are to be now installed. These generating units will be so arranged as to be operative in groups of three per bank in accordance with a similar grouping of the step up transformers. Electric travelling cranes of suitable capacity will be installed in the generator and turbine rooms.

The Generating Station will be built throughout of reinforced concrete upon plain concrete tailrace walls. A cross section of the building is shown in the cut, upon which will be observed the natural arrangement of the equipment and the resulting simplicity of the station design.

The Transmission system will be constructed upon a one-hundred foot private right-of-way, and by the shortest feasible route. The towers are built up of structural shapes in an economical design and are of two types,—braced in which the spread of the base is about one-fourth the height of the tower) and flexible, consisting of channel irons supported in a plane normal to the axis of the wires; both types will be supported upon rigid concrete footings. Each line of towers will support two three phase circuits of aluminum cable mounted upon pin type insulators.

A single circuit telephone line will parallel the Transmission Line, but upon cedar poles.

The Terminal Station in Winnipeg will receive power at 60,000 volts, and will deliver it to sub-stations at 12,000 volts, by means of a three conductor underground cable system.

The Transformers will be of the water cooled type in both Generating and Terminal stations, but of the water circulating class in the former, and of the oil circulating type in the latter station.

The high tension busbar system in both stations will be of the open type. In both stations a very complete system of switching will afford the maximum of flexibility.

The accompanying plan will indicate clearly the geographical relation of the Hydro-Electrical Plant to the City of Winnipeg. It was proven advisable that the railway system existing at the time of beginning work should be extended, and that the site of the works should be made easily accessible. To this end twenty-five miles of standard gauge railway, including two bridges over channels of the Winnipeg River, were constructed from Lac du Bonnet to the power station site. A small equipment, the property of the City, is now in operation thereupon.

Upon completion of construction of the plant, there will be an immediate market for a considerable block of the generated power, as the City is widely spread and is rapidly growing. Its street lighting and public building services will be supplied, as also will it use its own electric power for pumping its water supply. This supply is obtained from a series of artesian wells, each already equipped with electrically driven pumps. The problems of sewage disposal will also require the use of a pumping system before many years.

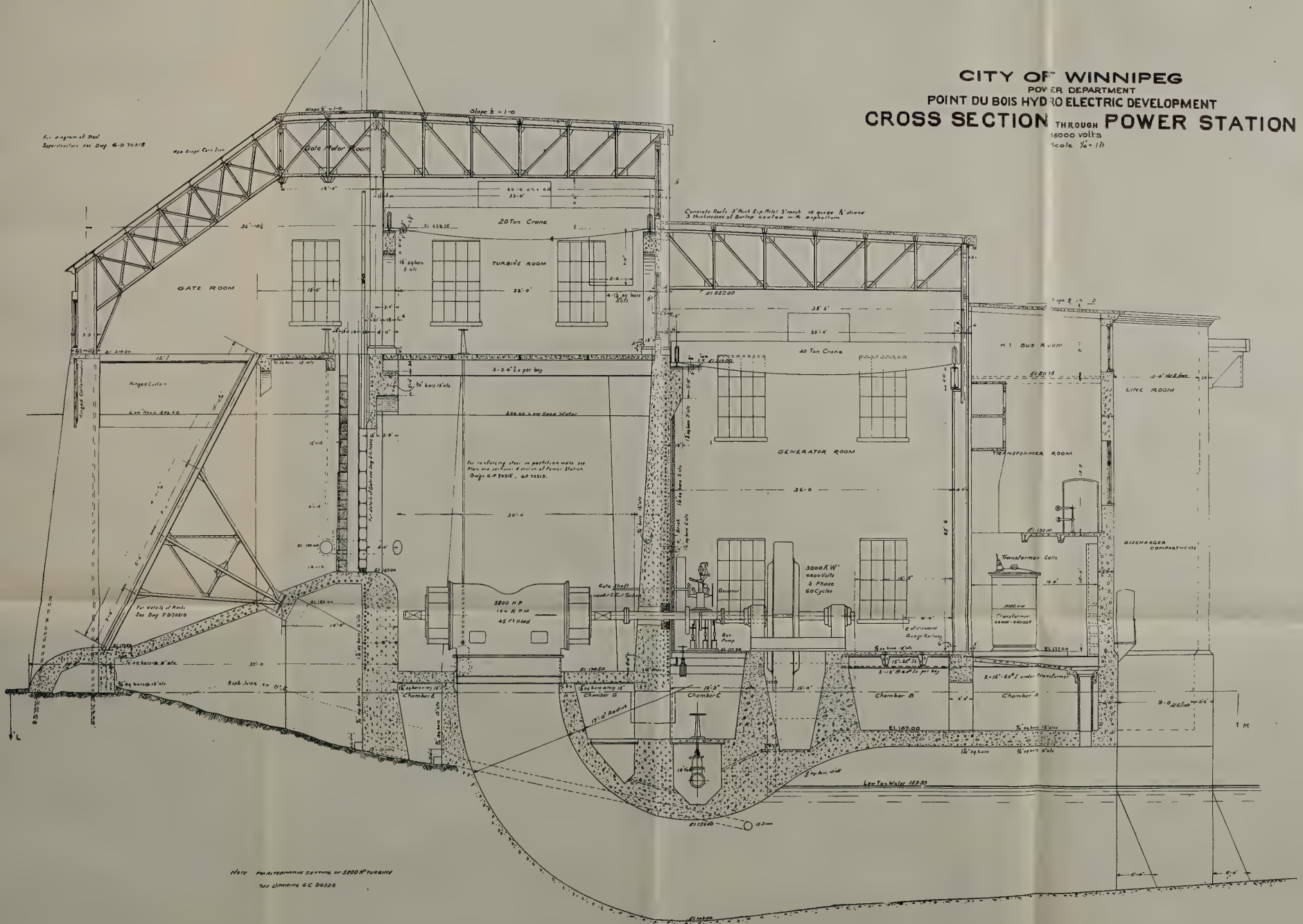
In addition to the municipal and other public services, there is a rapidly growing demand for electric power for manufacturing, and to this market the City supply will be offered at attractive prices. Even now there

are in operation in Winnipeg steam plants whose aggregate demand approximates fifteen thousand horse power; and the development of the vast country to the west of the City, combined with the very high freight rates from the east to Winnipeg, and the consequent cost of fuel all tend to force a rapid increase in the application of electricity here.

Upon deciding to invest municipal funds in this Hydro-Electric development, the Authorities placed the design and construction in the hands of Mr. Cecil B. Smith, Ma.E., of Toronto, Ontario, now of the engineering firm of Smith, Kerry and Chace. The City Council has also retained as a Board of Consulting Engineers, Messrs. Col. H. N. Ruttan, C.E., of Winnipeg; William Kennedy, Jr., C.E., of Montreal, and Prof. L. A. Herdt, E.E., of Montreal, Canada.

Winnipeg, July 15, 1909.

CITY OF WINNIPEG
POWER DEPARTMENT
POINT DU BOIS HYDRO ELECTRIC DEVELOPMENT
CROSS SECTION THROUGH POWER STATION
16000 volts
Scale 1/4" = 1 ft



PRINCIPAL MERIDIAN.



CITY OF WINNIPEG
MUNICIPAL ELECTRIC TRANSMISSION.

HIGH WATER LEVEL 196.00
LOW WATER LEVEL 192.50

CANAL
Excavated to El 193.00

LINE OF EXCAVATION

SHORE LINE

SPILLWAY El 206.0
WITH WORKS COMPLETED

Waste Sluice

FOREBAY

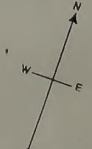
Excavated to El 193.00

LINE OF EXCAVATION

POWER STATION

HIGH WATER LEVEL 170.07
LOW WATER LEVEL 160.83

WINNIPEG RIVER.



CITY OF WINNIPEG
POWER DEPARTMENT
POINT DU BOIS HYDRO-ELECTRIC DEVELOPMENT
PLAN OF PROPOSED WORKS

Scale 1 inch = 100 Feet

C. G. Smith
Engineer

4 THREE PHASE TRANSMISSION
LINES TO WINNIPEG 77 MILES,
100 FEET RIGHT OF WAY.

Time Table

9 a.m., Special Train leaves Winnipeg,
C.P.R. Depot.

10.35 a.m., Arrive Lac du Bonnet.

12 noon, Arrive Point du Bois.

2 p.m., Luncheon.

2.45 p.m., Leave Point du Bois.

4.20 p.m., Leave Lac du Bonnet.

6 p.m., Arrive Winnipeg.

Return Fare \$1.85.

The number of the Party is limited to 200.